



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE  
United States Patent and Trademark Office  
Address: COMMISSIONER FOR PATENTS  
P.O. Box 1450  
Alexandria, Virginia 22313-1450  
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/710,761	08/01/2004	Kun-Chih Wang	NAUP0582USA	4760
27765 7590 04/03/2007 NORTH AMERICA INTELLECTUAL PROPERTY CORPORATION P.O. BOX 506 MERRIFIELD, VA 22116			EXAMINER KARIMY, MOHAMMAD TIMOR	
			ART UNIT	PAPER NUMBER
			2815	

SHORTENED STATUTORY PERIOD OF RESPONSE	NOTIFICATION DATE	DELIVERY MODE
3 MONTHS	04/03/2007	ELECTRONIC

**Please find below and/or attached an Office communication concerning this application or proceeding.**

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

Notice of this Office communication was sent electronically on the above-indicated "Notification Date" and has a shortened statutory period for reply of 3 MONTHS from 04/03/2007.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

winstonhsu.uspto@gmail.com  
Patent.admin.uspto.Rcv@naipo.com  
mis.ap.uspto@naipo.com.tw

# Office Action Summary

Application No.

10/710,761

Applicant(s)

WANG, KUN-CHIH

Examiner

Mohammad Timor Karimy

Art Unit

2815

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 02 January 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☐ Claim(s) \_\_\_\_\_ is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-16 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 01 August 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

## Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

## Attachment(s)

- ☒ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- ☐ Notice of Informal Patent Application
- ☐ Other: \_\_\_\_\_.

## DETAILED ACTION

### *Claim Rejections - 35 USC § 102*

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

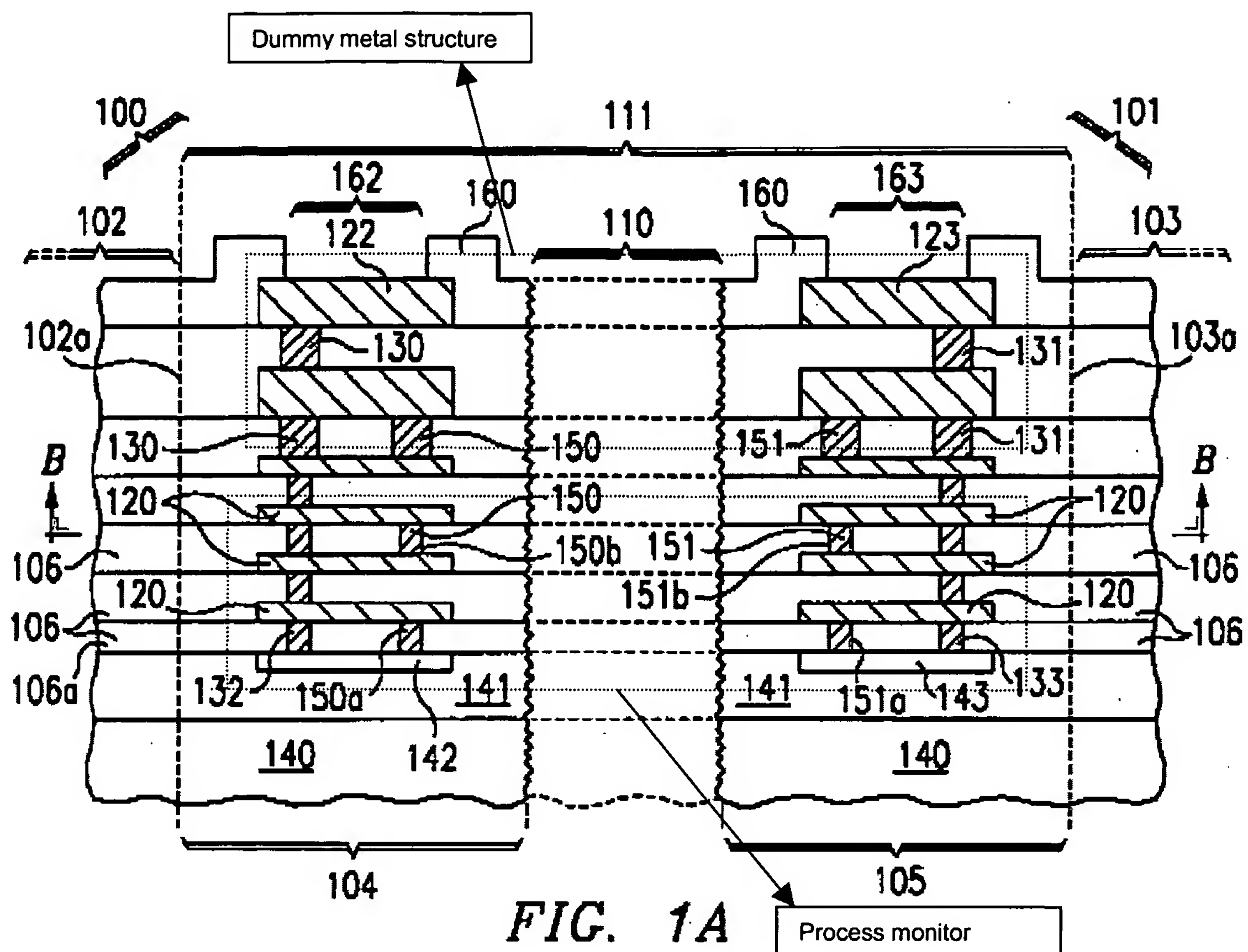
2. Claims 1, 3-8 and 10-16 are rejected under 35 U.S.C. 102(b) as being anticipated by West et al. (US Patent 6,521,975 B1).

With respect to claim 1, West discloses in figure 1A, a scribe line structure, comprising:

a substrate 140;

a plurality of dielectric layers 106 formed on the surface of the substrate 140 comprising a sacrificial structure which functions as the claimed process monitor pattern set in a scribe line region 111.

West further teaches a dummy metal structure (see figure 1A below) formed on the surface of the substrate 140 connecting with the process monitor pattern and exposed in the scribe line region.



With respect to claim 3, West discloses the scribe line structure of claim 1 wherein the dummy metal structure (see fig. 1A above) comprises a plurality of dummy vias 130.

With respect to claim 4, West discloses the scribe line structure of claim 1 wherein the dummy metal structure comprises a plurality of metal layers 122 (see fig. 1A above).

With respect to claim 5, West discloses the scribe line structure of claim 1 wherein the process monitor pattern is made of metal (column 7 lines 32-39).

Art Unit: 2815

With respect to claim 6, West discloses the scribe line structure of claim 1 wherein the process monitor pattern comprises metal structure, which functions as alignment marks (column 9 lines 63-65).

With respect to claim 7, West discloses the scribe line structure of claim 1 wherein the surface of the substrate further comprises a protective layer 160 covering two sides of the surface of dielectric within the scribe line region (see figure 1A).

With respect to claim 8, West discloses in figure 1A a scribe line structure comprising:

a substrate 140 the surface of the substrate comprising at least a scribe line region 111;

a plurality of dielectric layers 106 formed on the surface of the substrate 140 comprising a sacrificial structure which functions as the claimed process monitor pattern set in a scribe line region 111.

West further teaches a heat irradiative structure (dummy metal structure – see fig. 1A above) formed in the plurality of dielectric layers 106 connecting the plurality of dielectric layers with the surface of the substrate and exposed in the scribe line region 111 (metal layers 122-123 exposed in scribe line region 111).

With respect to claim 10, West discloses in figure 1A the scribe line structure of claim 8 wherein the heat irradiative structure is a dummy metal structure.

With respect to claim 11, West discloses the scribe line structure of claim 10 wherein the dummy metal structure comprises a plurality of dummy vias (130 & 131).

Art Unit: 2815

With respect to claim 12, West discloses in figure 1A the scribe line structure of claim 10 wherein the dummy metal structure comprises a plurality of dummy metal layers.

With respect to claim 13, West discloses the scribe line structure of claim 8 wherein the heat irradiative structure (dummy metal region) connects with the process monitor pattern (see figure 1A above).

With respect to claim 14, West discloses in figure 1A the scribe line structure of claim 8 wherein the process monitor pattern is made of metal.

With respect to claim 15, West discloses the scribe line structure of claim 8 wherein the process monitor pattern comprises metal structure, which functions as alignment marks (column 9 lines 63-65) .

With respect to claim 16, West discloses in figure 1A the scribe line structure of claim 8 wherein the surface of the substrate further comprises a protective layer 160 covering two sides of the surface of dielectric within the scribe line region 111.

### ***Claim Rejections - 35 USC § 103***

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 2 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over West in view of Chooi et al. (US Patent 6,284,657 B1).

Art Unit: 2815

With regard to claim 2 and 9, West discloses the scribe line structure of claims 1 and 8 as recited in the rejections of claims 1 and 8 above. West further teaches a plurality of dielectric layers comprising metal layers; however, West does not explicitly teach the dielectric layers having a dielectric constant less than or equal to 3.

Nonetheless, Chooi teaches in column 8 lines 78-52 a dielectric constant of  $K=1.9$  to  $2.1$  (dielectric constant for Teflon) for the dielectric and barrier layers. West and Chooi are combinable because they are from the same field of endeavor (namely using low-K dielectric materials within the metal interconnects). At the time of the invention, it would have been obvious to one of ordinary skill in the art to use Teflon having a dielectric constant of  $1.5$  to  $2.1$  as taught by Chooi in West's dielectric layers. The motivation for doing so would be to use low-K dielectric to reduce the parasitic capacitance in the semiconductor device (see column 2 lines 56-60). Therefore, it would have been obvious to combine West and Chooi for the benefit of reducing parasitic capacitance.

### ***Response to Arguments***

5. Applicant's arguments with respect to claims 1 and 8 have been considered but are moot in view of the new ground(s) of rejection.



Art Unit: 2815

**Conclusion**

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Assyama et al. (US Patent 6,881,597) discuss the use of sacrificial structures in a scribe line region.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohammad Timor Karimy whose telephone number is 571-272-9006. The examiner can normally be reached on 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

mtk

EUGENE LEE  
PRIMARY EXAMINER

